■ INSTRUCTIONAL REVIEW: TRAUMA

Fractures of the radial head

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Most fractures of the radial head are stable undisplaced or minimally displaced partial fractures without an associated fracture of the elbow or forearm or ligament injury, where stiffness following non-operative management is the primary concern. Displaced unstable fractures of the radial head are usually associated with other fractures or ligament injuries, and restoration of radiocapitellar contact by reconstruction or prosthetic replacement of the fractured head is necessary to prevent subluxation or dislocation of the elbow and forearm. In fractures with three or fewer fragments (two articular fragments and the neck) and little or no metaphyseal comminution, open reduction and internal fixation may give good results. However, fragmented unstable fractures of the radial head are prone to early failure of fixation and nonunion when fixed. Excision of the radial head is associated with good long-term results, but in patients with instability of the elbow or forearm, prosthetic replacement is preferred.

This review considers the characteristics of stable and unstable fractures of the radial head, as well as discussing the debatable aspects of management, in light of the current best evidence.

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Fractures of the radial head generally have two distinct presentations: 1) a stable isolated undisplaced or minimally displaced fracture, where restoration of movement is the objective and long-term problems from slight articular incongruity are unlikely (Fig. 1); and 2) an unstable fracture that occurs as part of a complex injury to other osseous or ligamentous structures, and where contact between the radial head and the capitellum is important for the alignment and stability of the elbow and forearm (Fig. 2).[1-4] Isolated minimally displaced fractures are nearly always impacted, with intact periosteum, and are unlikely to displace. In contrast, unstable fractures usually involve several fragments that have detached and are mobile, with little or no soft-tissue attachment.[1,2,5,6] As a result, experts emphasise vigilance with fracture fragments that are detached and mobile, as the injury is often associated with an elbow dislocation, proximal ulna fracture, or injury to the interosseous ligament of the forearm (longitudinal radioulnar dissociation or the so-called Essex-Lopresti lesion).[3,7-9]

The place of surgery for a stable isolated fracture is debatable, as non-operative treatment is associated with good long-term results.[10-13] Symptomatic radiocapitellar arthrosis after this type of fracture is rare,[12,14-16] and stable minimally displaced fractures do not create a bony block to elbow flexion and extension. The goal of operative treatment is to address crepitation with forearm rotation or restricted movement, both of which are uncommon.[13,17-19] The most common adverse outcome of a stable isolated fracture is elbow stiffness from capsular contracture, and the most important aspect of treatment is confident stretching exercises to regain movement.[19,20]

For unstable fractures, concerns include which fractures can be repaired and what is the best technique for internal fixation[20-24]; the circumstances under which the radial head should be excised, and whether partial excision is an option[16,25-27]; and whether the excised head should be replaced, and if so, which is the best prosthetic design to use.[12,14-16] Generally, the primary goal of operative treatment of unstable fractures is to prevent dislocation or subluxation of the elbow and forearm.

Epidemiology and patterns of injury

Fractures of the radial head account for about 4% of all fractures, > 30% of all fractures involving the elbow and > 50% of all fractures of the proximal forearm.[28-30] The incidence of

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Fig. 1

Anteroposterior radiograph showing a stable isolated slightly displaced fracture with an articular step, but no gap between the fragments. The fracture was more subtle on the lateral radiograph. The periosteum is probably intact. The only potential adverse outcome of this fracture is possible hindrance of forearm rotation.

Fig. 2

Anteroposterior radiograph showing an unstable displaced fracture of part of the radial head. The missing fragment can be seen behind the capitellum/lateral column, superior to the radial head. This fracture probably occurred as part of an elbow fracture–dislocation.

fracture of the radial head varies between 25 and 39 per 100 000 adults per year,[30-32] with an approximately equal gender distribution and a mean age at injury of 40 years.[28,30-33] About 90% of these injuries do not have an associated dislocation, instability of the forearm, or another fracture.[30,32,34] Radial neck fractures are about half as common, the incidence increases with age, and complex fractures are less frequent.[28,30,32]

Stable *versus* unstable injuries. Fractures of the radial head occur when an axial load drives it into the capitellum.[30,35,36] Most are stable isolated non-displaced or minimally displaced fractures of the neck or the anterolateral portion of the radial head.[17,30,37] Clinically relevant associated injuries are not seen, but incomplete injury to the collateral ligaments and capitellar bone bruises can be identified with MRI.[5,6,38] One recent study documented MRI evidence of ligament injury in over two-thirds of stable fractures of the radial head, but found they did not affect motion or the Mayo Elbow Performance Index (MEPI).[6,38] One caveat is the patient who has sustained a high-energy injury with an apparently stable fracture, which on occasion may prove to be unstable and part of a more complex injury.[2,7,8,30,32]

Displaced unstable fractures are often associated with other fractures and complete ligament injuries.[5,32,34,39] For these injuries, it is important to consider the mechanism of injury, radiological characteristics and clinically significant associated injuries. Unstable fractures readily displace as a result of disruption of the periosteum, leading to loss of radiocapitellar contact and potential chronic instability. Davidson et al,[34] in a prospective series of 50 consecutive radial head and neck fractures, found that all patients with a displaced comminuted radial head fracture had evidence of axial or valgus instability, with no instability seen in patients with an undisplaced or minimally displaced fracture. In a series of 296 radial head fractures Rineer et al[39] found no proximal ulnar fractures or dislocations of the elbow in minimally displaced fractures (Mason type 1[40]), but these were found in all displaced whole-head fractures (Mason type 3).[39] The authors defined instability of a radial head fracture as complete loss of contact of at least one fracture fragment, and was strongly associated with a proximal ulnar fracture or elbow dislocation with partial head fractures (Mason type 2).

Particularly in elderly patients, apparently unstable displaced and/or comminuted fractures of the radial head are sometimes observed without elbow dislocation or proximal ulna fracture, but it is probably best to consider the fracture as a marker for a complex unstable injury until proved otherwise.[2] It can be useful to look for one of the following unstable injury patterns[1,3,31,33]: 1) radial head fracture with posterior dislocation of the elbow[41,42]; 2) radial head fracture with posterior dislocation of the elbow and fracture of the coronoid process[42,43]; 3) radial head fracture with rupture of the medial collateral ligament (MCL) or capitellar fracture; 4) radioulnar dissociation (Essex–Lopresti lesion[9] and variants): radial head fracture + rupture of the interosseous ligament + rupture of the triangular fibrocartilage

complex (TFCC)[44]; and 5) proximal ulnar fracture with fracture of the radial head.[45-47]

Stable isolated fractures of the radial head

Clinical assessment. A proportion of radial head and neck fractures are not visible on standard anteroposterior and lateral radiographs of the elbow and are referred to as 'occult' fractures. In these patients there is tenderness over the radial head and anterior displacement of the fat pad by haemarthrosis on a lateral radiograph.

For stable isolated fractures, aspiration of the haemarthrosis has been proposed to relieve pain and determine whether there is a block to movement that might merit operative treatment.[48-52] A study of 16 non-displaced radial head fractures found that aspiration reduced articular pressure and provided pain relief (from 5.5 to 2.5 on a 10-point visual analogue scale).[52] A recent randomised trial found no significant differences in function or pain between patients treated with aspiration only or aspiration alongside injection of local anaesthetic.[51] To our knowledge, there is no evidence that examination for a bony block to forearm rotation is reliable or accurate, as it is difficult to distinguish reluctance to move the forearm as a result of pain or a true mechanical block. A few patients with full forearm rotation have palpable crepitation over the radial head with forearm rotation, but it is not clear if this is associated with greater discomfort or impairment in the long-term.

Classification. A synopsis of the various classification systems is given in Table I.[40,41,53,54] Mason[40] classified 'marginal' and 'undisplaced' fractures of the radial head as type 1, and 'displaced' partial fractures that were more than a 'marginal fragment' as type 2, but did not quantify these terms. Broberg and Morrey[41] suggested that to be considered a type 2 fracture, the fragment should constitute ≥ 30% of the articular surface and be displaced by ≥ 2 mm, but this assessment has demonstrated only moderate reliability.[55-58] There is conflicting evidence regarding the benefit of obtaining a specific oblique radial head–capitellum or external rotation radiograph to assess displacement or improve reliability.[59,60]

Management. A large proportion of fractures of the radial head are isolated stable injuries, for which non-operative management achieves a good or excellent result with full forearm rotation, no or minimal restriction of the flexion arc, and no or minimal arthrosis in the long-term.[11,12,17,61]

The predominant adverse outcome of a Mason type 1 (undisplaced or minimally displaced fracture) is elbow stiffness. Herbertsson et al[14] documented full movement and only three patients with occasional pain among 32 Mason type 1 fractures managed non-operatively, at a mean of 21 years after injury. Prospective data have supported these findings in the short-term.[17] Whether the elbow is immobilised for a short period or mobilised immediately appears to make no difference.[62] Liow et al[62] compared immediate active mobilisation for five days of immobilisation before active mobilisation in a prospective randomised trial and found no differences after the first week, and excellent outcomes in all patients. A randomised trial comparing two weeks of immobilisation in either 90° of flexion (n = 29) or full extension (n = 23) *versus* no immobilisation (n = 29) found that immobilisation in flexion resulted in some loss of extension.[63] Stiffness may occur as a result of capsular contracture, for which stretching exercises and a positive mindset to stretch pain will help movement to be regained.[64,65] A recent prospective randomised study of 180 isolated stable fractures found early mobilisation to be safe and effective, and a delay of 48 hours before mobilisation to be potentially advantageous.[66]

The only clear indication for surgery for an isolated minimally displaced stable radial head fracture (Mason type 2) is a mechanical block to forearm rotation, but such a block is unusual.[2,17-19,53] A recent systematic review on the management of Mason type 2 radial head fractures without associated fractures or dislocation of the elbow concluded that there was insufficient evidence to draw conclusions about the optimal treatment of these injuries.[67]

Akesson et al[12] analysed 49 patients at a mean of 19 years after non-operative treatment for an isolated Broberg and Morrey[41] modified Mason type 2[40] fracture and found that 82% of patients had no pain, but 12% underwent radial head excision four to six months after injury for unclear reasons. In a short-term prospective study of Mason type 2 radial head fractures, only two of 78 patients were found to have a block to forearm rotation and underwent surgery, with the remainder achieving an excellent or good outcome after non-operative treatment.[17] Overall, only 4% of the patients had stiffness.

Although good outcomes have been described with operative fixation of minimally displaced, stable isolated fractures of the radial head in retrospective case series,[68] others have reported a high complication rate despite acceptable function, and no prospective studies have been reported.[13] Lindenhovius et al[13] reported the long-term outcome of 16 patients managed with open reduction internal fixation (ORIF) for an isolated Mason type 2 fracture at a mean follow-up of 22 years. They reported a complication rate of 31%, a mean flexion arc of 129°, a mean Disabilities of Arm, Shoulder and Hand (DASH) score of 12 points, and good or excellent MEPI in 81%. The authors concluded that the long-term results of operative treatment gave no appreciable advantage over non-operative management.[13] However, a comparison of radial head excision with internal fixation for isolated stable Mason type 2 fractures at medium-term follow-up found superior surgeon and patient reported outcome scores for ORIF.[69]

Stable, isolated partial fractures of the radial head can be exposed via the Kocher interval between the extensor carpi ulnaris (ECU) and the anconeus,[2] if care is taken to protect the lateral collateral ligament (LCL). With this approach, it is advised to use the posterior margin of ECU when dissecting through the capsule and annular ligament, while also protecting the LCL and avoiding elevation of the

Table I. Description and reliability of the original Mason classification and the three commonly used modifications. Reliability data are based upon interpretation of plain radiographs

Classification	Description	Intra-/interobserver agreement
Mason[40]		Satisfactory/moderate
I	Non-displaced fracture	
II	Displaced partial head fracture	
III	Displaced entire head fracture	
Johnston[54]		Satisfactory/moderate
I	Non-displaced fracture	
II	Displaced partial head fracture	
III	Displaced entire head fracture	
IV	Fracture with elbow dislocation	
Broberg and Morrey[41]		Excellent/moderate
I	< 2 mm displacement	
II	≥ 2 mm displacement and ≥ 30% articular surface	
III	Comminuted fracture	
Hotchkiss[53]		NA*/moderate
I	Non-displaced/displaced marginal fracture, no block to forearm motion, manage non-operatively	
II	Displaced fracture amenable to open reduction internal fixation	
II	Displaced fracture not amenable to ORIF (instead excision or replacement)	

* NA, not applicable

anconeus.[2,70] A more anterior interval splitting the extensor digitorum communis (EDC), or between the EDC and the extensor carpi radialis brevis (ECRB), has been advocated because it better protects the LCL and provides good exposure.[2,53] The key is to stay anterior to the anteroposterior midpoint of the capitellum. When exposure along the radial neck is needed, the posterior interosseous nerve is protected in the lateral approach by pronating the forearm.[71] There are various techniques for identifying the non-articular part of the proximal radioulnar joint on the radial head: 1) between Lister's tubercle and the radial styloid[72]; 2) forearm in neutral rotation, lateral 90° arc[73]; 3) forearm in full supination, plate placed as posteriorly as able.[74] Implants applied outside this zone should be countersunk beneath the surface of the bone.

Unstable fractures of the radial head

Clinical assessment. Apparently stable fractures may be part of a more complex injury. Patients with a high-energy injury mechanism (e.g. a fall from a height) merit careful evaluation as even well-aligned and apparently stable fractures on occasion prove to be unstable and part of a more complex injury.[2,7,8] Extensive swelling and ecchymosis may indicate instability of the forearm or elbow. These findings require assessment for tenderness and bruising over the MCL complex, the interosseous ligament and the distal radial ulnar joint (DRUJ).

When radioulnar dissociation (interosseous ligament injury) is suspected, bilateral posterior–anterior (in neutral rotation) and true lateral radiographs of both wrists are useful to look for subluxation or dislocation of the DRUJ.[75-77] The degree of radial shortening indicative of an Essex-Lopresti lesion is debated, with figures ranging from 2 mm to 1 cm.[77,78] A recent study found 60 of 237 patients had wrist and forearm pain six weeks following an ipsilateral radial head fracture, but only 22 (9%) had radial shortening of > 2 mm.[79] A total of 18 patients had an excellent or good MEPI at short-term review with one patient requiring surgery for forearm instability. It was concluded that ≥ 4 mm of shortening was clinically relevant, and that those with less shortening could be treated conservatively. What is apparent, is that a high index of suspicion is essential with increasing fracture complexity and higher energy injuries.[7,8]

The reliability of ultrasound, CT and MRI for the diagnosis of interosseous ligament injury is difficult to establish.[80-84] In cadaver studies MRI had an accuracy of 96%, with a sensitivity ranging from 88% to 93% and specificity of 100%.[82,84] Most unstable radial head fractures merit operative treatment, enabling intra-operative assessment with the push–pull test of axial traction and compression of the hand and wrist, looking for a change > 3 mm in the distance between the radial neck and the capitellum after excision of the radial head, which is considered adequate to diagnose interosseous ligament injury and instability of the forearm.[85]

Classification. The inclusion of radial neck fractures and fractures associated with a dislocation of the elbow (Johnson modification[54]) in Broberg and Morrey's modification[41] of the Mason classification[40] may not be helpful, given the importance of characterising the radial head fracture even when it is associated with other injuries.[2] Hotchkiss[53]

modified the Mason classification based on clinical parameters such as a block to forearm rotation and the ability to repair the fracture, but it is not clear that either of these can be assessed reliably or accurately (Table I).

Guitton et al[86] developed a methodology to quantify the morphology of fracture fragments of the radial head using three-dimensional (3D)-CT in 46 patients. Radiologically unstable fractures, as defined by Rineer et al[39] as loss of cortical contact of at least one fracture fragment with a gap seen on the radiographs, were found in all whole-head fractures. They found that unstable displaced partial fractures associated with one of the complex injury patterns described above often consisted of multiple small displaced fragments. Elsewhere, one study of quantitative 3D-CT in Mason type 2 fractures showed that the most common location for the fracture was the anterolateral quadrant with the forearm in neutral rotation.[40] Guitton and Ring[87] found that 3D-CT did not significantly improve inter-observer agreement among orthopaedic surgeons using the Broberg and Morrey modification[41] of the Mason classification.[40]

Management. A systematic review investigating the results of the management of radial head fractures using a range of surgical interventions *versus* non-operative management was unable draw definitive conclusions on the optimal treatment of complex unstable radial head fractures.[88] In selected patients with an unstable fracture, non-operative treatment can be pursued if the patient accepts the potential drawbacks, such as requiring delayed surgery.[89-91] Broberg and Morrey[41] described a small series of type 2 or 3 fractures of the radial head (using their own classification) associated with dislocation of the elbow and treated with cast immobilisation with or without early excision of the radial head. They found that delayed excision was generally required to improve forearm rotation after type 3 fractures, but not after type 2 fractures.[41] In a series of 23 patients with a displaced radial head fracture (17 type 2, six type 3) and an associated dislocation of the elbow, four of eight patients with an associated coronoid fracture had a re-dislocation (three with early radial head excision and one treated non-operatively).[42]

Excision of the radial head. The radial head should not be excised in the presence of associated elbow or forearm instability, as restoration of the radiocapitellar contact is essential.[41,61,90-93] For traumatic instability of the elbow, once the ligaments have healed and the elbow is no longer at risk of dislocation or subluxation, resection of a deformed radial head can improve forearm rotation and is associated with a good long-term outcome.[27,94]

Biomechanical studies have demonstrated that both the size of the fracture as well as excision of the radial head influence stability in both the intact and ligament-deficient elbow.[93,95,96] Partial excision leaves the elbow prone to instability, as the most important anterolateral part of the head is usually fractured.[3,97] A cadaveric study reproduced fractures of the radial head through the anterolateral quadrant and applied different shearing loads to the elbow at varying degrees of flexion, reporting an inverse relationship between radiocapitellar joint stability and a decreasing shear load required as the fracture size increased.[93]

Early excision of the radial head for isolated Mason type 3 fractures has been reported by some to give a good outcome, suggesting that replacement be reserved for patients with an unstable elbow.[98] Elbow dislocations associated with an isolated fracture of the radial head have been reported to be stable.[41,42] Excision of the radial head alone is hazardous when there is an unstable coronoid fracture, and is contraindicated when there is injury to the interosseous ligament.[16,99,100] If excision is considered, the push-pull test should demonstrate no more than 2 mm to 4 mm of movement of the radius,[85] and the elbow should not dislocate in full gravity extension after the lateral collateral ligament complex is reattached to the lateral epicondyle. Potential sequelae of excision of the radial head in an unstable complex fracture pattern include proximal radial migration, radioulnar convergence and instability of the elbow.[76,101-103]

Good long-term results were reported after excision of a comminuted radial head fracture in 26 patients aged < 40 years (six Mason type 2, 20 Mason type 3), although most had some evidence of longitudinal migration of the radius, some of whom had resulting disability.[16] The average MEPI was excellent (95) and the mean DASH was 6. A total of 22 patients had evidence of longitudinal migration of the radius, with an average of 3.1 mm (0 to 9) ulnar positive variance, although only three were > 5 mm. Three patients had ongoing wrist pain, all of whom had proximal migration of the radius (one with DRUJ instability on clinical examination). Four patients had increased valgus laxity and two had moderate posterolateral rotatory instability. Similar long-term results have been reported in retrospective series from Italy and Spain.[99,100]

A comparison of radial head excision (n = 15) with open reduction and internal fixation (n = 13) for 28 Mason type 3 fractures associated with 16 elbow dislocations, five coronoid fractures and one capitellar fracture, demonstrated better function from internal fixation at a mean of three and ten years following injury.[27]

Open reduction and internal fixation. Plate and screw fixation is used predominantly for fractures involving the whole head, but difficulties can arise because of the presence of the hardware and anatomical conformance,[2,104,105] with some authors advising planned implant removal to improve forearm rotation.[73] Others try to avoid using a plate, instead placing screws obliquely from the head to the neck,[106] or forgoing fixation of the head to the neck altogether.[107]

Many good reports for internal fixation have been for isolated partially displaced fractures of the radial head, where a good result might be expected even with non-operative management.[68,97,108-110] In contrast, internal fixation of displaced whole-head fractures has been associated with high rates of early failure, nonunion and poor

functional results.[34,101,111-113] Fragmentation of the head, metaphyseal bone loss, irreparable and misshapen fragments all make internal fixation less appealing. It is unclear whether series reporting good results for internal fixation of displaced whole-head fractures have excluded fractures with these characteristics.[27]

Prosthetic replacement. Prosthetic replacement is indicated for fractures that are associated with instability of the elbow or forearm and cannot be fixed satisfactorily. Radial head replacement is recommended over ORIF for Essex-Lopresti injury variants as chronic forearm pain and instability have been associated with failure of ORIF.[76] It is unclear as to how to balance the drawbacks of an absent radial head (occasional slight valgus or posterolateral instability and potential acceleration of ulnohumeral arthrosis[114-116]) with the potential for long-term problems caused by a radial head prosthesis.[117-119]

The proximal radius has a complex anatomy, which is difficult to replicate with a prosthesis.[117,120] The early silicone implants fragmented and caused a destructive synovitis.[121-123] More rigid prostheses made of metal, pyrocarbon, and even methylmethacrylate now prevail.[24,124,125] Different approaches have been tried to tackle the asymmetrical anatomy. Some prostheses have a smooth stem that is not rigidly fixed to the neck, and others have a mobile articulation at the neck (bipolar prostheses),[126-128] which provides improved alignment with the capitellum, and reduces the force across the radiocapitellar joint,[129,130] but with potentially less stability when there is associated soft-tissue disruption,[130-132] as well as the development of osteolysis related to polyethylene wear.[133,134] In contrast, monobloc designs that are rigidly fixed to the neck have increased rates of predominantly asymptomatic bone loss at the radial neck.[135,136]

Comparable short- to mid-term results have been reported for the loose spacer and the cemented bipolar implants.[126,127,134] A recent prospective randomised controlled trial with two year follow-up compared a monopolar fixed neck, titanium radial head prosthesis matched to each patient (n = 22) with ORIF (n = 23), and found a significantly better results (91% good or excellent *vs* 65%, $p < 0.01$) and lower complications (13.6% *vs* 47.9%, $p < 0.01$) with replacement.[137] Comparable results were reported from another short-term randomised controlled trial by Ruan et al[138] using a bipolar cemented Tornier prosthesis.

A complication of radial head replacement is related to 'over-stuffing' of the joint.[118] Recent data have suggested that the proximal edge of the prosthesis should sit no more than 1 mm proximal to the corner of the lesser sigmoid notch on the coronoid,[117,135,136,139] which can be referenced to radiographs of the uninjured elbow.[140] This should avoid radiocapitellar erosions, synovitis, ulnohumeral malalignment and the development of arthritis. Others have suggested the importance intra-operative visualisation of the lateral ulnohumeral joint space.[141]

Additional complications include nerve injury and dislocation. Some surgeons confidently ascribe proximal forearm pain to radiological changes associated with a loose prosthesis,[136,142] whereas others find no association between radiological changes and symptoms, at least with prostheses that are intentionally loose.[127,143]

The operative exposure of unstable fractures is usually simplified because elbow fracture-dislocations are associated with avulsion of the origins of the LCL and EDC from the lateral epicondyle, and these structures can be mobilised distally providing excellent exposure to the radial head and ulnohumeral joint. There is usually a small rent in the fascia indicating the interval to be developed. Fractures associated with proximal ulna fracture can often be addressed through the posterior rent in the muscle by recreating the deformity. Another alternative is the Wrightington approach, elevating the aconeus from the proximal ulna and then performing an osteotomy to remove the insertion of the LCL complex at the crista supinatoris.[144]

Summary of the current evidence

For stable undisplaced or minimally displaced partial fractures of the radial head, non-operative management with early mobilisation provides good or excellent results in most patients. Residual stiffness is a problem in a few. However, it is essential that all patients with apparently stable fractures are assessed thoroughly for evidence of elbow and forearm instability, particularly following a high-energy injury.

For unstable complex radial head fractures, a thorough assessment of elbow and forearm instability is required. Where this is present, evidence suggests that the restoration of radiocapitellar contact is essential. From the current information, and given the fact that most unstable fractures are comminuted and difficult to reconstruct, radial head replacement appears favourable. In the absence of instability, early or delayed excision of the radial head can be undertaken.

Shortcomings of the evidence. Most of the evidence to date comes from retrospective case series, many promoting a specific technique. Some patients with isolated, stable partial articular fractures with > 2 mm displacement have pain, crepitation or limited movement many months after the fracture. It is not clear whether these symptoms will resolve, or whether better results would be provided with operative treatment.

For unstable fractures that are part of a more complex injury, the imperfections of prosthetic replacement and the uncertain long-term consequences of a prosthesis articulating on cartilage, create a dilemma as to how far attempts should be taken to reconstruct the radial head before resorting to prosthetic replacement.

Directions for future research

Large prospective cohort studies of patients with isolated, slightly displaced partial articular fractures of the radial

head would help establish the incidence and risk factors for the development of discomfort and dissatisfaction. Psychological and sociological factors must be taken into account given that they are often the best determinants of symptoms and disability. Advocates of ORIF for the stable isolated slightly displaced fractures need to demonstrate a benefit over non-operative treatment in a prospective randomised controlled trial – a trial that would likely have to be very large given the low rate of adverse outcomes. For unstable fractures, we need more long-term data on prosthetic replacement and randomised trials comparing both ORIF with prosthetic replacement as well as various types of prostheses.

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